State of research concerning institutions and instruments to control global environmental change in the Netherlands: conference report

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Introduction

The Netherlands HDP Committee aims to stimulate Dutch researchers to participate in national and international global change research and to facilitate contacts between these researchers and potential funding agencies. The activities of the Committee fit in with those of the International Human Dimensions Programme on Global Environmental Change (IHDP), an international, interdisciplinary, social science programme to promote and coordinate research aimed at describing, analysing and understanding the human dimensions of global environmental change.

One of the specific research themes of IHDP focuses on institutions. The Netherlands HDP Committee had the objective to facilitate the research contacts with respect to institutions by organizing a conference. In order to broaden the scope of this conference and to have the possibility to invite some international scholars as well, the initiative was joined by the Dutch National Research Programme on Global Air Pollution and Climate Change (Nationaal Onderzoeksprogramma Mondiale Luchtverontreiniging en Klimaatverandering/NOP).

The conference was organized by the Maastricht European Institute for Transnational Legal Research (Metro) and was held in Maastricht on 21-22 June 2001.

The programme was prepared by a programme committee consisting of Professor Michael G. Faure LL M (Maastricht University), Dr Joyeeta Gupta (Institute for Environmental Studies, Amsterdam) and Prof. Andries Nentjes (University of Groningen), assisted by Dr Ans Vollering (Netherlands HDP Committee) and Drs Marcel Kok (NOP).

The goal of the conference was 1) to analyse the state of the art with respect to research conducted in the Netherlands concerning the role of institutions and instruments to control global environmental change, and 2) to identify the possible Dutch contribution to international plans within the framework of the IHDP programme.

This chapter reports on the most important research results obtained at the conference, by providing a summary of most of the papers presented.

The papers centred on the institutions necessary to create a framework to control climate change; a large number of the papers also focused on the instruments and policies which have been devel-

oped to control climate change. Most of the papers had some relationship with the Kyoto Protocol of 1997. This is no surprise since it is and will stay a milestone in the process of getting climate change on the political agenda and taking the first step towards internationally coordinated action. Thus, in this chapter we will first present papers discussing and analysing the Kyoto Protocol, mainly focusing on the design and functioning of the flexibility mechanisms (2. The Kyoto Protocul). Then we will discuss a few papers that look beyond Kyoto and generally address the issue of what type of institutional change is necessary in order to realize the transition to a carbonless society in the 21st century.

The Kyoto Protocol

The relative advantages of the different instruments

The Kyoto Protocol defines three instruments by which Annex I countries can obtain part of their greenhouse gas (GHG) emission reductions from non-domestic sources: Emission Trading (ET), Joint Implementation (JI) and the Clean Development Mechanism (CDM). Luke Brander (IVM, Free University of Amsterdam) discussed their most important, as yet unresolved design aspects, such as supplementarity, hot air, adoption tax, inclusion of sinks, crediting periods, compliance rules and liability provisions[1]. Qualitative arguments for the effects that current proposals can be expected to have on design and the distribution of cost impacts are given. A comparison of quantitative estimates of four recent studies shows that the Annex 1 emission reduction requirement might be realized by domestic action (up to 30 percent), emission trading and JI (30 percent) and CDM (at least 40 percent), assuming there are no ceilings on using the flexibility mechanisms. Non-ratification of the Protocol by the US will reduce the price of tradable CO_2 equivalents, thus reducing the compliance cost of ratifying Parties.

Alternative design options for emissions trading

International emissions trading and JI are the instruments that allow the transfer of GHG emissions between private parties in Annex I countries. Boom and Nentjes (University of Groningen) argued in their paper that adequate functioning of the two international flexibility mechanisms highly depends on how well the national instruments are designed and implemented[2]. Two blueprints for national flexibility in controlling CO_2 emissions are discussed: the cap and trade scheme and the credit trading scheme. The blueprints are schemes that include all sectors of the economy: from energy-intensive industry up to heating, electricity consumption and car use by households. In the cap and trade scheme, emission allowances are grandfathered in specified quantities to participants. In the credit trading scheme, allowed emissions are based on performance standards. Both schemes combine downstream distribution of allowances to energy users with upstream monitoring of compliance as distinctive features. International emissions trading is conceived as international linkage of national cap and trade schemes.

To foster environmental effectiveness, only Annex I Parties with national cap and trade schemes that meet well-defined criteria in terms of monitoring emissions, allowance registration and enforcement should be allowed to participate in the select club of Annex I Parties engaged in international permit trading between private parties. It is argued that the transaction cost of JI can be brought down by embedding it in internationally linked national schemes of performance standards in combination with credit trading.

In terms of effectiveness and efficiency, the cap and trade variety is the best solution, nationally as well as internationally. Credit trading requires frequent adjustment of the performance standards and is administratively a bit more complicated than cap and trade; perhaps more serious is that it gives too weak an incentive to reduce fossil fuel intensity per unit of output. Therefore, national and international credit trading is a second-best option, but it will meet less resistance from interest groups.

International trade law and emissions trading

Economists may devise their blueprints for effective and efficient flexibility mechanisms, but the actual discussions on shaping the instrument in successive COPs have concentrated on specific operational strategic issues, as Grimeaud (Maastricht University) made clear in his paper[3]. The draft guidelines confirm that legal entities (private parties) may participate in international emissions trading, but leave it to national authorities to determine under which nationally regulated conditions they may participate in such a regime. Emission trade between Annex I Parties and transfer of parts of assigned amounts will be allowed only in so far as certain eligibility criteria have been fulfilled, such as adequate monitoring and reporting.

The Kyoto Protocol specifies that achievement of the objectives on climate change shall not result in violation of international trade law. Grimeaud identified potential international trade disputes between WTO members. Such conflicts may arise if the US does not ratify the KP and the EU does. Here EU climate policies and measures may restrict the ability of the US to sell energy-related and GHG-emitting products to the EU. Even trade between ratifying Annex I Parties might be restricted by differences in national technical, fiscal and emission trading rules that do not meet the WTO requirement of non-discrimination and where it cannot be shown that no alternative measures, less restrictive to international trade, exist.

Since emission allowances can not be considered as goods or services under the WTO, Annex I Parties will be able to adopt rules on national emissions trading that limit the export or import by domestic regulated companies of allowances and that prohibit the import/export of allowances from/to specific Annex I parties who do not comply with their eligibility requirements. Yet, on the other hand, it may well be that such national rules on emission trading would affect indirectly the international trade in energy and energy-related products, which would have to hold a valid allowance and be specifically covered by WTO law as 'tangible goods'.

Emissions trading, competition distortion and state aid

The question whether the introduction of an emission trading scheme would create trade restrictions also haunts the EU, where it in particular relates to the trade between Member States. A potential source of conflicts are differences between the domestic permit allocation procedures of the Member States where one might handout permits for free (grandfathering) and the others auctions the allowances. Could such differences distort competition and be conceived as state aid in a European emission trading market? Woerdman (Groningen) showed in his presentation that it depends on whether one takes an efficiency or equity perspective[4]. There is no problem from an efficiency perspective. However, the competitive distortion and state aid issues are relevant from an equity perspective, so Woerdman held.

From an efficiency perspective, firms receiving permits for free do not have a cost advantage over firms in other Member States that auction the permits, because the former firms have to include the opportunity cost of using the permits to cover the firm's emission in the product price. This means that grandfathered firms are not advantaged, so that there is no state aid. In this view, there is also no need to harmonize permit allocation procedures.

However, grandfathered permits are a capital gift to the firm, inducing a windfall profit, so that an identical firm abroad which has to buy its permits has a higher cash outflow and hence less financial resources. Therefore, from an equity perspective, competition ('the level playing field') is distorted and state aid occurs because the mere allocation of permits leads to unequal changes in the financial positions and competitive relations between firms across the EU. Ceteris paribus, a grandfathered firm in one Member State is then advantaged because it has more financial resources than its auctioned competitor in another Member State. In this view it is also desirable, or even necessary, to harmonize permit allocation procedures.

The revised (2001) Community guidelines on state aid for environmental protection place a stronger emphasis on cost internationalization than the 1994 guidelines do. This seems to support grandfathering because of its opportunity costs. However, the provisions for investment and operating aid suggest that firms may receive no more than a certain percentage (for instance 50%) of their permits for free during a limited period of time (for instance five years) as a transition phase towards an auctioned scheme.

In its decision of April 2000 on carbon trading in Denmark, the European Commission considered grandfathering to be state aid, but nevertheless exempted it by using economic, legal and political arguments. Although it mentioned neither the opportunity cost argument nor the desire for a level playing field, grandfathering was interpreted as a wealth transfer that could affect the equal treatment of firms. This sets a political (albeit not legal) precedent in the EU to interpret grandfathering in terms of fairness.

In the context of economic instruments for environmental policy, the Commission has to decide whether permit allocation differences among Member States are compatible with the rules (and exemptions) on state aid. If equity considerations play a role in this decision, the issues of competitive distortion and state aid become relevant in developing a European carbon trading market.

Trading of ozone depleting chemicals

The US has been the pioneer in establishing emission-trading schemes. The only EU programme in place is the transferable production quota of ozone depleting chemicals (ODCs). As a Party to the Vienna Convention and Montreal Protocol, the EU cooperates with the other Parties in a scheme of phasing out the production of ODCs. Production quotas have been grandfathered to established producers in proportion to HODC output in a reference year. The quota can be transferred among producers. Marjan Peeters (Groningen) discussed and assessed in her presentation the legal aspects of the transfer provisions in the European ODC regulations, among them the discretion for administrative intervention with trade and the compliance provisions[5].

Implementing Kyoto in the Netherlands

The flexibility provisions in the Kyoto Protocol – and in article 17 on Emissions Trading in particular, which was inserted in the Protocol despite strong resistance from the EU – has stimulated several Member States to consider options for increasing flexibility in national implementation. The European Commission played its role in the process by publishing a Green Paper on emission trading for energy intensive industries in April 2000. In the Netherlands the efforts to implement the recommendations of the Rio de Janeiro Conference of 1989 have been rather disastrous. Instead of stabilization on the 1990 GHG emission level in the year 2000, emissions were considerably higher. More radical efforts and instruments might be needed to avoid a repeat of this in the first decade of this century. Transferability of emissions, respectively emission reductions, will reduce cost, thus mitigating resistance against more stringent targets. Backes and Teuben (University of Utrecht) discussed the recent proposal for NOx emission trading for energy-intensive industry[6]. It is basically a scheme of uniform performance standards with the flexibility to sell emission credits to a firm which emits less than the standard allows. Purchasers are the firms which have difficulties in meeting the new stringent standards. There are signs that the NOx credit trading scheme has set a precedent that will be followed in the design of CO_2 emission trading for Dutch energy-intensive industry.

Although an observer without legal training might think that adding credit trading to a scheme of performance standards that is already in place is a minor adjustment, fitting within the existing framework of environmental legislation, the legal interpretation tells another story as Backes and Teuben show. The European IPPC directive, elaborated in the Dutch ALARA (as low as reasonable achievable) and European BAT (best available techniques) principles are incompatible with emissions trading.

ALARA has been interpreted as representing a minimum as well as maximum standard. Requirements based on the ALARA principle can not be complied with by buying emissions. Moving pollution from one location to another is in conflict with the idea that in the present location-based and environmental licence system the individual installation is the object of environmental regulation.

Unlike ALARA, the BAT principle embedded in EU legislation represents only a minimum requirement: more stringent national requirements are allowed. However, unconstrained emissions trading would mean that by buying emission allowances, a single enterprise could emit more than the BAT-based standards or its environmental licence allow.

CDM in the Netherlands

CDM is in principle a promising option for climate policies. Rianne de Leeuw and Ekko van Ierland (Wageningen University) pointed out that to realize CDM's potential many complications related to the practical application of the instrument have to be overcome[7]. They assess experience in the Netherlands where the government has broken new ground as a donor of CDM projects by allocating its CDM subsidies by way of an auction for CDM projects. In order to identify the practical bottlenecks, four CDM project cases are discussed in depth. The case studies reveal that the main problems are related to the criteria of additionality and sustainable development. Another important topic is the monitoring of the projects and the danger of carbon leakage if the monitoring takes only place at project level. Since developing countries are not required to report GHG emis-

sions completely on the basis of a well-documented national inventory, it will be extremely difficult to assess the net impacts of a CDM project.

Thus, many difficulties will have to be overcome before the government of the Netherlands can implement CDM while adhering to its own criteria, which require that emission reductions achieved abroad through CDM will be more efficient than domestically, that they are of high quality and that the emission reduction technologies contribute to sustainable development. The combination of efficiency and high-quality emission reductions might prove to be conflicting. It will require either a political decision to favour one criterion over the other, or a very specific and restrictive set of conditions. However, measures to enhance the quality of emission reductions generated through CDM will almost inevitably increase transaction costs, raise the price of emission reductions generated through CDM and diminish its significance as an instrument of climate policy.

Promoting the use of renewable energy sources

Among the measures to mitigate climate change a more intensive exploitation of renewable energy sources (RES) is an option. Bongaerts and Dogbe (University of Freiberg) analysed the position of electricity generation from RES in the EU[8]. Although the EU can be seen as an important player in international policy-making on climate change, one has to take into account that with respect to promotion of electricity from RES the EU has few or no powers to achieve its ambitious target of doubling the share of RES in total energy production from 6 to 12 percent in 2010. Any real contribution will have to come from the actions of the Member States. That is why studying their policies is of interest.

The instruments that have been applied aim at demand and supply management. Demand management creates a market for electricity from RES by a statutory obligation for certain groups of customers to purchase a minimum quantity of 'green' electricity. A number of countries have introduced flexibility or plan to do so by allowing transfer of (trade in) such purchase quota. Feed-in tariffs – which oblige grid operators to buy electricity from RES at a regulated minimum price – are also widely used. Supply management instruments are mainly of the fiscal type: lower taxes, tax rebates and subsidies. The authors argue that demand management instruments are probably more effective than supply demand instruments. Examples such as 'green electricity' certificates – sometimes in combination with renewable obligations – or Ireland's AER illustrate the point. Whilst supply side instruments are rather unspecific as to the total effect on supply, with demand management instruments one can meet the objectives almost by definition. Moreover, supply side instruments – which require fiscal measures – typically depend on public budgets, which are always limited.

Leadership in multilateral negotiations

Studies in the field of international relations have shown that countries that muster domestic support more effectively than other countries in translating international agendas into domestic policy agendas or in implementing international agreements may enjoy 'leadership through unilateral action' in multilateral negotiations. However, those countries that have a potential to exert this type of leadership in terms of domestic policy are often a middle power, which is not necessarily influential globally. This observation raises the question whether a regional organization can be a device between the potential leadership of a middle power and the actual leadership in the global negotia-

tion process. Kanie (Kitakyushu University) tackled this research question by examining how the Netherlands, being a small country, was able to play a leading role in the negotiations leading up to the Kyoto Protocol, through the European Union acting as an intermediating regional organization".

In the 1990s, it became clear that, in order to take on its aspired leadership role in the UNFCCC process leading up to Kyoto, the EU would first have to develop a coherent position. To be credible it would imply internal agreement about burden sharing within the EU, but discussion ended in disagreement up until 1996. When the presidency of the European Council was taken over by the Netherlands in 1997, it was clear that the key was a convincing approach to burden sharing backed up by scientific rigour. The Triptych Approach, invented by Dr Bert Metz, chief negotiator for the Netherlands at Kyoto and elaborated by a Dutch research institute (ECOFYS), is an ingenious method to calculate intermediate emission reduction targets for countries, taking into account the sectoral differences in emission reduction potential between countries.

In January 1997 the Dutch presidency of the EU sent a proposal based on the Triptych Approach to the Member States aiming at 15 percent reduction for the EU relative to 1990. Since the MS representatives could agree on no more than internal burden sharing of a 10 percent EU emission reduction, it was decided that in order not to undermine the EU's ability to take a lead in the global negotiation the EU would propose a 15 percent reduction target. If the Kyoto agreement were to exceed a reduction of 10%, then the remaining 5% would have to be renegotiated after the Kyoto Conference. Thus, the Member States agreed that 10% would be enough until Kyoto and so avoided acrimonious discussion about the division of the remaining 5%.

In summer and fall of 1997 it became apparent that the EU proposal contained the most ambitious target for the reduction of GHGs. The G77 expressed support for the EU proposal later on followed by a group of influential ENGOs. In Kyoto, the EU troika – i.e. the Netherlands, Luxembourg and the UK – negotiated on behalf of the EU. The chief negotiator for the Dutch segment was Dr Bert Metz, the main architect of the Triptych Approach and main negotiator for the Netherlands since COP1. As the EU managed to have the most ambitious target among the Annex I Parties at Kyoto and subsequently won the support of many developing countries and ENGOs, the Dutch network of governmental and non-governmental people on climate change could work to support the negotiations towards more ambitious targets. In the end, 38 industrialized countries agreed to reduce greenhouse gas by 5 percent relative to 1990 levels between 2008 and 2012, with differentiated reduction targets of 6% for Japan, 7% for the USA and 8% for the EU.

The case shows how a regional organization can be an important device when a middle power country wants to exert a bigger influence in global negotiations. Three factors made the Dutch case possible. First, the intellectual as well as instrumental (diplomatic) capacity at the national (domestic) level made it possible for the Netherlands to make use of the EU as a device to extend its potential. Without domestic capacity, a regional organization cannot be used as a device to increase its diplomatic influence. Secondly, the coherency of the EU as a coalition made it possible to be a recognisably important power block in the global negotiation process. (Of course, the economic scale was another important factor that made the EU one of the most important parties in the final stage of the negotiation.) A third important factor is the institutional design of the EU. Because the EU presidency can exercise a fairly big degree of political power both internally and externally and because the EU troika can negotiate externally on behalf of the EU, the climate change political/diplomatic potential of the Netherlands could be well transferred to the EU negotiations.

The influence of climate change on trade

The general economic idea behind the call to reduce climate change is that the voluntarily agreed commitment to reduce the emission of greenhouse gases by Annex 1 countries will lead to a Pareto optimal level of welfare. Starting point is therefore the basic economic insight that internalizing externalities leads to efficiency. However, political practice shows that there are many difficulties, e.g. in implementing the Kyoto Protocol, because although there is much to gain for everyone, there will inevitably be losers as well.

One obviously important issue within the political negotiations concerning climate change is how the various policy mechanisms contained in the Kyoto Protocol (emission trading, joint implementation and clean development mechanisms) may affect the international trade streams. That is the topic of the paper which was presented by Wang, Nijkamp and Kuik (Free University of Amsterdam)[10]. They selected from the set of available general equilibrium models the GTAP model, which allows measurement of the impact of possible future regimes to achieve emission reduction, in comparison with a business-as-usual scenario.

They come to various interesting results concerning e.g. the implementation of emission reductions with or without CDM and they look at the impact of various scenarios whether they do or do not include the US. The result is, not surprisingly, that at the global level, the business-as-usual scenario will be not optimal. The implementation of e.g. CDM activities is actually welfare improving rather than costly. However, the problem remains that it may be more advantageous for one single country not to participate. That is obviously the well-known free rider problem. During future renegotiations of the Kyoto protocol, the major challenge will be to remedy this. The authors apply this model to a situation where they assume that the US would not go along with the emission reduction measures and conclude that it may indeed be beneficial for the US not to engage in emission reduction measures. However, the actual emission reduction that will then be achieved at world level, will be lower in this US stand-alone case. Thus, applying this GTAP model to climate change issues allows some of the trade effects of the implementation of various instruments and the effects of various political scenarios (e.g. the US joining or not joining) to be illustrated.

Papers focussing on the situation after Kyoto

The multisector convergence approach

The UN Framework Convention on Climate Change recognizes the problems of burden sharing by noting that countries have common but differentiated responsibilities. In the Kyoto Protocol the emission reduction targets for the developed countries (Annex I signatories) have been agreed upon. The second round involving potential commitments from developing countries (non-Annex I signatories) is likely to be much more complex. The vast differences between the average developing and the average developed country with respect to historical cumulative emissions, present income levels and future adverse impacts lead to difficult ethical questions. Bruggink (ECN) outlines the role of principles of distributive justice in establishing global burden sharing rules.[11]. He summarizes lessons learned from international negotiations between Annex I countries so far and presents a new, pragmatic approach to global burden sharing. Global burden sharing can illustrate the consequences of normative choices quantitatively and thus provide a road map towards common ground in the dialogue on global participation.

Climate change actions involve costs and benefits that are distributed across nations in different and uncertain ways. Presumably, international negotiations on the distribution of costs and benefits are not based on pure self-interest, but also on principles of distributive justice. There are, however, many principles of distributive justice that can be considered for deriving burden sharing formulas in the case of climate change actions. Four commonly used criteria are:

- Historical contribution to the problem: countries that are the cause of the problem should pay to solve it; often referred to as the guilt principle or the polluter-pays principle.
- Ability to pay for the solution: countries that can afford the economic burden should shoulder it; often called the capacity-to-pay principle.
- Equality of rights: everybody has the right to an equal share of allowable greenhouse gas emissions. The rich should pay the poor if they wish to use more than their fair share of the global commons (equality principle). This principle is often used as a distant target to strive for and is prominent in burden sharing rules based on the Contraction-and-Convergence approach.
- Historical claims or principle of grand-fathering, present levels of emissions constitute a fair initial distribution of emission rights. It is often invoked as a convenient starting point for assigning emission rights, but is not very appealing from an ethical perspective.

That formal burden sharing rule can form an excellent vehicle for persuasion and communication has been clearly demonstrated in the case of differentiation of the European Kyoto target among Member States. The differentiated emission reduction targets for EU Member States have been calculated using the so-called Triptych Model. The model is based on a sectional approach to target setting, which allows the application of different principles for each sector. The domestic sector is subject to the equality principle of distributive justice (per capita convergence). The principle for the energy-intensive industry is based on a norm for efficiency improvement (historical rights). The principle for power generation is based on the national generation mix (not actually an equity argument, but based on considerations of acceptable marginal costs of abatement). Reduction targets were based on baseline reference scenarios that allowed for higher growth in lower income countries. The model judiciously combined elements of equity principles with realistic considerations regarding cost effectiveness and carbon leakage.

The Multi-Sector Convergence approach has been developed in a joint study by CICERO and ECN specifically for global burden sharing where the participation of non-Annex I countries forms the key issue. Its main features are based on a mix of general principles of fairness, sectional target levels and country-specific allowances. It combines the ethical elements of the Contraction-and-Convergence approach with the sectional detailing of the Triptych approach. Initial short-term commitments are based on expected greenhouse gas emissions by sector in 2010. Ultimate long-term commitments are based on equal per capita emission norms per sector in 2100. This amounts to a gradual transition from grandfathering to equality on the basis of sectional emission rights. These rules are similar to the well known set-up of the Contraction-and-Convergence Approach, though with reduction rates not determined on the national level, but on the sectional level similar to the Triptych approach.

A numerical case study illustrates the basic features of the Multi-Sectional Convergence approach. The distribution of emission trajectories it generates for major emitters are shown in Figure 1.

At each point in time countries are divided into two groups and those with national per capita emissions below this average. For countries with national per capita emissions above the global average

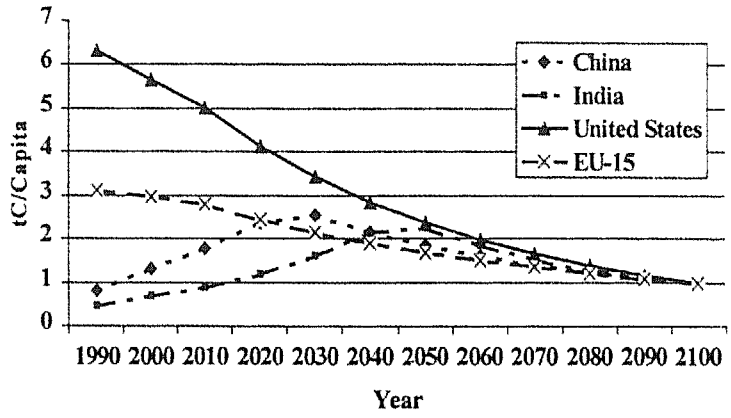

Figure 1. Per capita emission allowances

for the corresponding year a geometric convergence from their 2010 sectional per capita emissions to the final per capita sectional allowance in 2100 is assumed f or the second group, a specific annual growth rate of emissions (3 %) until they have reached the global average is assumed. Then they are allowed an adjustment period of 15 years after which they are subject to the convergence conditions of the first group of countries. Figure 1 presents the calculated emission trajectories for four major global emitters: the USA, the EU-15, India and China.

The evolution from grandfathering to equalization over the greater part of a century in the Multi-Sectional Convergence approach is intended to provide a road map with a persuasive function in horizontal negotiations between nations at very different levels of economic development. On the other hand the sectional orientation will be important for vertical negotiations within nations between governments and sectional interest groups. Combining these two features in a hybrid approach will provide international negotiators with an effective communication tool on both the international and national level.

The COOL project

Hisschemöller et al. (Free University of Amsterdam and Wageningen University) reported on findings from the project Climate OptiOns for the Long term (COOL), which aims at generating strategic recommendations for long-term climate policy in the Netherlands[12]. The COOL project addressed the question how greenhouse gas emission reductions of up to 80% for the Netherlands and Western Europe can be realized by 2050.

The project adopted a participatory approach. Dialogue groups at the global, European and national level have assessed the strengths and weaknesses of policy options for reducing greenhouse gas emissions. The dialogue groups included participants from government agencies, environmental and consumer NGOs, business and agriculture.

Climate policies for the decades to come face a serious dilemma: although government intervention in most countries has decreased over the last few decades and is supposed to decrease further as a consequence of the liberalization of energy markets, the transition to a carbonless economy is supposed to require a huge involvement of government. These observations appear quite irreconcilable. In order to structure the dialogue and to articulate conflicting assumptions with respect to technological feasibility and institutional form, three trajectories or regimes for managing the tran-

sition to a carbonless economy have been spelled out and labelled regulation, emission trading and shared responsibility.

The regulation regime realizes the 80 percent emission reduction by 2050 by means of progressive standard setting and long-term standards for specific sectors. In the COOL National Dialogue, arguments in support of this trajectory were put forward for the housing and transport sectors. The trajectory fits in nicely with Dutch policy to improve the energy efficiency of buildings by adjusting the standards with reference to the latest technologies. The dialogue groups were confident that significant emission reductions in the future may be realized providing that the regime is technology forcing in its emission requirements.

An emission trading regime can be set up by entitling private parties to specified quantities of emissions and allowing transfer of the entitlements. The scheme requires high-quality monitoring of emissions and registration of allowance ownership, hand in hand with strict enforcement.

The shared responsibility trajectory realizes the 80 percent emission reduction target by private parties who cooperate to realize self-established emission targets on a voluntary basis. In contrast to regulation and trading, which both reflect conceptions of steering, shared responsibility assumes that parties themselves take initiatives and develop climate policies. The government comes in only after societal demand for policy has emerged. The underlying assumption here is that there is broad social agreement that significant emission reductions are needed. Parties are committed to contribute as much as they feel is possible. The three regimes do not necessarily exclude each other. They may even be complementary over time.

The National Dialogue Integration Workshop concluded the dialogue. The majority of participants indicated that, given the analysis of options in their dialogue groups, an 80% emission reduction in the Netherlands by 2050 could be feasible from a technological point of view, provided that institutional and social barriers are removed during the coming era. However, many within the majority were sceptical with respect to the acceptability of two major reduction options: CO_2 removal and storage, and biomass. Large-scale removal of CO_2 is considered a non-sustainable option, and for biomass it is doubted whether institutional arrangements can be created to safeguard the sustainable production and use of biomass.

A key question is how the relation between regime and technical feasibility is seen.
Table 1 presents, in an ideal typical sense, the 'extreme positions' with respect to this question.

Cell A articulates the view that competitive technologies, including CO_2 removal and storage and mixing natural gas with hydrogen, are available. The major problem addressed in cell A is that these must get a fair chance on the market. Allowing the market to set a price for CO_2 facilitates the acceptance of CO_2-neutral technologies by companies and consumers. Cell B articulates the view that emission trading must, for specific sectors such as the car industry, be preceded by long-term standards in order to realize CO_2-neutral technologies that are not yet available. Once these technologies are available the policy approach shifts to cell A. Cell C articulates the problems that exists when technologies are available but the market is not able to deal with them due to market deficiencies or a lack of early movers. Progressive standard setting is a regime capable of dealing with these problems. Cell D articulates a strategy that is most in contrast with an emission trading regime. Technology development is forced by PPP mega-investments. Precedents are the Apollo and Manhattan projects in the US and the European Space Programme. The major argument in support capable of organizing and implementing mega-investments directed at developing and implementing innovations.

Table 1 Conflicting views on transition to a decarbonized economy

Technology available? Emission trading regime	Dominant in the mid/long Term	Dominant a.s.a.p.
NOT YET	R&D through cross-sectional cooperation. Major role of government in financing and R&D infrastructure. D	Long-term standard setting for specific sectors or technologies/combine with ecotax to avoid externalities B
YES	C Government support to force innovations that are still weak into the market (create lead customers).	A Acceptation by market parties and consumers.

The National Dialogue illustrates that diverging expectations as regards the technological innovations needed are linked to diverging views on preferable regimes for supporting the transition. Competing views emerge. They may have a bearing on problems that compete but also may emerge one after another in the process of transition. The most challenging question for long-term climate policy at this stage is to find a way to deal in a tailor-made fashion with these problems over time.

Transport and climate change

The problems of managing transition, brought out in the COOL Dialogue, are also the subject of the paper presented by René Kemp (Maastricht University) and Ellen Moors (University of Utrecht)13. They discuss transport and how climate protection goals can be achieved in the sector through what they call modulation policies. Although the focus is on Dutch policy the diagnosis and remedies have a broader application to other European countries.

Within the existing policy belief system in the Netherlands, changes in technology and behaviour are seen as alternative ways of dealing with transport problems. These two options are pursued parallel to but not really in combination with each other. The same applies to private and public transport, which are seen as separate rather than symbiotic. Transport authorities have not yet embraced the new perspective of integrated mobility. No systematic trajectories for experimenting with and learning from new transport technologies and concepts are visible in the Dutch transport technology policy. There have been interesting initiatives but these have not led to concrete programmes and pathway policies pursued as part of a wider transition agenda. One explanation for this is that there is no perspective of sustainable transport that is guiding decision makers.

In order to make transport more sustainable, the current mode of governance has to change. For this the policy process should be broadened and sustainable transport should be made a societal goal for which societal support and resources are mobilized. A modulation approach exploits windows of opportunity and seeks to modulate ongoing dynamics into the direction of climate change protection. For this it is important to have an idea of the relevant trends and expectations of key actors within the domain of transport and mobility.

Although authorities cannot plan for sustainable transport, there are many ways in which public authorities can make transport cleaner, safer and reduce energy use and CO2 emissions. Besides making the existing transport system more sustainable there should be an effort towards system innovation involving radical change in the way in which we satisfy our mobility needs. Climate protection benefits could be pursued as part of the endeavour to achieve system innovation. System innovation requires a new approach, one of process management aimed at the modulation of dynamics and creating path dependencies in the right direction, i.e. the modulation approach. Among the suggestions for modulation policies for achieving GHG emission reductions in transport are the following.

Given the inertia in transport systems and uncertainty about what solution is best from a sustainability point of view and user point of view, a first suggestion for policy is:

- Engage in the use of social experiments and create niches for promising technologies (strategic niche management).
  This raises the question of what technologies one should experiment with. The answer, given in the literature on Strategic Niche management is: pathway technologies that help to bridge the gap between the current regime and a new, sustainable one, and thus help to escape lock-in. This leads to the second suggestion.
- Identification and active stimulation of pathway technologies.
  This is well accepted in the transport technology policy: electronic vehicle identification, automatic vehicle control, interoperability and global positioning system are key technologies for system innovation. To these one can add: electric propulsion and transport information, booking and reservation systems, which have a great potential for achieving environmental sustainability benefits in the long term when they are incorporated into an integrated mobility system. They are supported by public policies and there has been investment in these technologies by industry but there is a gap between research and diffusion.

To increase the chance that a transition will occur and to make sure that the path chosen is the best one, one should explore different paths and the possibilities for cross-linkages and cumulating. This leads to a third suggestion:

- Focus on routes of niche accumulation that may lead to regime changes.
  There cannot be transition without a transition path. There is a need to identify possible paths and explore these. One should evaluate present transport regimes and the possibilities to shift them in desirable directions and identify opportunities to influence niche branching and niche piling. The focus should be on experimenting with a wide range of niche technologies, which in the long term could serve as stepping-stones to a new transportation regime and be set up in such a way that both suppliers and users learn about new possibilities. The suggestion therefore is:
- Modulate 'promise-requirement' cycles of perceptions and expectations.
  New technologies hold promise but are still ill developed in terms of user requirements. This calls for the need to stimulate promise-requirement cycles and the attendant resource mobilization activities.
- Development programmes for system innovation such as integrated mobility and mobility management.
  Opportunities for system innovation producing sustainability benefits should be explored and exploited. An example of system innovation in transport is integrated mobility or chain mobil-

ity, i.e. the multiple uses of aligned transport services, which reduce congestion and lead to less emissions and fewer accidents.

- Transition management as integrative framework achieving greater coherence in policy action. The above should not be pursued as isolated actions. They are best undertaken as part of a transition programme with development rounds in which progress is assessed and goals and instruments are evaluated and adjusted.

Institutional change: implication for climate change policy

Unlike the US, where climate policy will develop within a remarkably stable institutional environment, the long-term prospects for climate control actions in Europe are certain to be profoundly influenced by the course of institutional change. An analysis of institutional change in Europe as presented by Bennett (Syzygy) showed that time and again it is powerful social, economic and political driving forces that determine the course and timing of institutional change rather than the operations of the institutions themselves[14]. For instance in the period up to 1987, broad social and political consensus on the need to mitigate increasingly conspicuous environmental problems led to the EU adopting some 200 legal measures concerning the environment, despite the fact that the original Treaty of Rome provided no explicit legal basis for the Community to regard the environment as a legitimate object of Community action. The key issue is therefore how the driving forces behind the continuing institutional revolution in Europe will shape the boundary conditions that largely determine the future course and substance of climate control actions. Bennett suggests that four forces may prove to be particularly influential in this respect during the coming decades: globalization, EU enlargement, climate change research and changes in social values and individual perceptions.

Globalization – the process through which the markets and operations of companies become increasingly international – will have far-reaching impacts at all institutional levels. It will drive the process of harmonizing the economic policies and legislation of the main trading blocs – the EU, NAFTA/FTAA and parallel initiatives in Asia and Africa – and thereby reduce the scope for autonomous EU policy on many environmental issues. But this development is also likely to feed countervailing needs for, first, more scope for local, national or regional differentiation with respect to trade regulations and instruments where this is necessary in the interests of environmental protection and, second, more effective international enforcement regimes.

For Europe itself, the greatest institutional impacts during the next two decades will in all probability follow from the EU enlargement process. The greater diversity, institutional complexity and implementation challenges that are the inevitable consequences of enlargement (soon to 21 Member States and in the longer term possibly 35), will drive EU policy-making away from the traditional practice of negotiating highly specific and detailed regulations and directives. Instead a far greater emphasis will be placed on framework measures that lay down basic rules and targets for a particular policy object but which allow Member States a greater degree of discretion in how the objectives are achieved and which instruments are applied for that purpose. For environmental policy, this implies a shift to the formulation of locally or regionally appropriate environmental and ecological quality and performance targets rather than detailed emission or technological standards. Where feasible, groups of Member States may establish particular forms of flexible cooperation, for example with regard to the use of certain economic instruments.

It is probable, if further research were to confirm the more pessimistic viewpoints and a number of conspicuous natural disasters were to be attributed to climate change, that the impact on public, corporate and political perceptions will be sufficient to drive a strengthening of international mechanisms for dealing with global-commons problems, or the creation of a dedicated and substantive global climate regime. Consumer pressure will also be such as to force business to demonstrate its environmental responsibility through initiatives that reduce the climate impact of branded products through innovations in product design and manufacture.

Perhaps the most interesting and potentially the most volatile driving force for institutional change in Europe is public perception. Profound longer-term impacts on institutions could result from the increasing need of individuals, groups and organizations to exert pressure on public and private institutions regarding matters of concern, a tendency supported by their expanding capability to do so through developments in ICT. The question arises how these developments will interact with the cultural preference in Central and Eastern European countries for strong political institutions, particularly if and when these countries make up a substantial proportion of EU Member States. Changing public perceptions on democratic accountability and the legitimacy of EU institutions could force radical changes in the architecture of European governance. To be sure, these are foreseeable opportunities that are likely to be created by the institutional impact of driving forces. In that sense they represent a surprise-free scenario. But Europe's future will not be surprise-free. The importance of developing response strategies as a means of exploiting events that may not be predictable but can at least be anticipated cannot be underemphasized.

Results

As was shown when describing the contents, the objective of this conference – to obtain an impression of the research performed in the Netherlands concerning the role of institutions and instruments to control global environmental change – has certainly been achieved. Many high-quality papers were presented, and were interesting both for the further development of the various separate disciplines and for a multidisciplinary cooperation. Indeed, at the conference academics and practitioners from many different backgrounds participated. There were economists, lawyers, social and political scientists. Moreover, since all of these scholars were asked to present their research in such a way that the results and methodologies would be understandable also to a non-specialist, good communication between these various disciplines was possible. Many academics participated in the discussion of the papers. The organizers were able to encourage cooperation between the various disciplines in the Netherlands. It can certainly be considered a success that now e.g. lawyers, economists and social scientists in the Netherlands have met (in some cases for the first time) and have discovered their common interest in issues related to instruments and institutions to control global environmental change.

Moreover, the conference has also enabled the academic world to gain an impression of some of the research undertaken in the Netherlands concerning the social science aspects of global environmental change. Given the participation also from abroad there may be future international contacts leading to further research in this domain.

Hence, this conference certainly has contributed to promoting IHDP research in the Netherlands. Moreover, it has also identified the issues some of the academic community in the Netherlands is involved with. This may also more clearly identify the potential contribution of the Dutch academic community to the IHDP programme.

Future

Obviously this first Dutch conference on institutions should be considered as merely a first step. The first results in the sense of scholars from various academic backgrounds getting together and exchanging views have already been achieved. But it is clear that steps should be taken to encourage this cooperation in future research projects as well. Thus, within the Netherlands HDP Committee, the results of this conference will be examined more closely and it will be analysed what the exact achievements are in the sense of identifying the potential Dutch contribution to the IHDP.

Second, there will be a concrete academic output as a result of this conference. A selection of the papers presented at the conference will, after a review process, be published with an international academic publisher. The papers will be brought together, introduced and edited by Michael Faure, Joyeeta Gupta and Andries Nentjes. Thus the organizers of the conference hope to be able to present to the international research community a few clear results of the Dutch academic research with respect to the social science aspects of global environmental change. Obviously it is also hoped and expected that this publication will further the research contacts among the academics involved and that this will encourage others to get involved in this type of research.

Third, within the Netherlands HDP Committee (and probably the Dutch national research programme on global air pollution and climate change as well) further attention will be paid to how the current enthusiasm for this topic in the social science community in the Netherlands can be further promoted and encouraged. On the one hand, both committees will obviously try to encourage Dutch public authorities to put these themes high on the research agenda, also when deciding on priorities concerning research funding. In addition, the conference in Maastricht showed that even with relatively modest means, nice results as far as the multidisciplinary cooperation can be achieved. Therefore, plans are being formulated for a follow-up conference to be held in approximately two years. This will on the one hand enable some of the research contacts that have emerged at the conference to grow and lead to a specific academic result; on the other hand it may be expected that the follow-up conference may encourage others who have not yet shown an interest in this topic to focus their research also on the social science aspects of climate change issues. Moreover, we hope that this presentation of some of the Dutch research in this area may also encourage colleagues abroad to seek research cooperation with the Dutch academics working in this area.

We wish to conclude by thanking once more the sponsors of the conference in Maastricht: the Netherlands HDP Committee (HDP-Commissie) of the Royal Netherlands Academy of Arts and Sciences (Koninklijke Nederlandse Akademie van Wetenschappen/KNAW) and the Dutch National Research Programme on Global Air Pollution and Climate Change (Nationaal Onderzoek Programma mondiale luchtverontreiniging en klimaatverandering/NOP).

Notes

[1] Brander, L., "Kyoto Mechanisms: the relative advantages and disadvantages of emissions trading, joint implementation and the clean development mechanism."
[2] Boom, J.-T. and Nentjes, A., "Alternative design options for emissions trading: a survey and assessment of the literature".
[3] Grimeaud, D., "International trade law and emission trading: a careful design required".
[4] Woerdman, E., "Developing a European carbon trading market: will permit allocation distort com-

petition and lead to state aid?".

[5] Peeters, M., "A legal analysis of the feasibility of the environmental permit-market".

[6] Backes, C. and Teuben, R., "Legal aspects of the Dutch approach of CO2 reduction".

[7] van Ierland, C. and de Leeuw, R., "CDM in climate policies in the Netherlands: a promising tool?"

[8] Bongaerts, J. and Dogbe, G., "Optimal institutional arrangements and instruments for the promotion of energy from renewable sources".

[9] Kanie, N., "Domestic capacity, regional organisation and global climate change regime building process".

[10] Wang, S., Nijkamp, P. and Kuik, O., "Global environmental change regimes. Impact assessment on the basis of an extended GTAP-model".

[11] Bruggink, J., "The multisector convergence approach to global burden sharing of greenhouse gas reductions".

[12] Hisschemöller, M., Andersson, M., van de Kerkhof, M., Tuinstra, W., "What we do not know yet about the institutions needed for the transition toward a decarbonised economy".

[13] Kemp, R. and Moors, E., "Modulating dynamics in transport for climate protection".

[14] Bennett, G., "Institutional change in Europe and the implications for climate control measures".